

ABSTRACT

VOLTAGE CONTROLLED OSCILLATOR CIRCUIT  
FOR A LOW POWER ELECTRONIC DEVICE

- The voltage controlled oscillator circuit includes a resonant circuit, with two inductive elements ( $L_1, L_2$ ) and a variable capacitive element ( $C_v$ ), which is connected to a high potential terminal ( $V_{EXT}$ ) of a voltage source, and a pair of cross-coupled NMOS transistors ( $N_1, N_2$ ), which is connected between two oscillating signal terminals ( $V_A, V_B$ ). Each NMOS transistor of the pair is connected in parallel to a diode mounted NMOS transistor ( $N_3, N_4$ ) so as to form a current mirror. An identical current is supplied to each diode mounted transistor in an oscillating signal amplitude regulation loop. Two resistors ( $R_1, R_2$ ) series connected between the gates of the transistors of the pair ( $N_1, N_2$ ) allow extraction of the common mode voltage to be stored in a filtering capacitor ( $C_m$ ) in order to bias a reference NMOS transistor ( $N_5$ ) connected to a reference resistor ( $R_3$ ). The current value supplied to the diode mounted transistors is dependent upon the value of the resistor and the detected common mode voltage. Consequently, the common mode voltage decreases with an increase in the oscillating signal amplitude, and vice versa.
- This oscillator circuit can be used in a low power electronic device, such as a portable telephone or a watch.

Figure 3